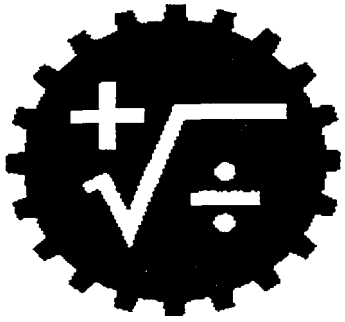
Assessment Annotations
for the Curriculum Frameworks

Mathematics

Grades 4, 8, and 10



Missouri Department of Elementary and Secondary Education
Robert E. Bartman, Commissioner of Education

MATHEMATICS- ASSESSMENT ANNOTATIONS

For The

Mathematics Curriculum Frameworks

The attached document provides supplemental assessment information to *Missouri's Framework for Curriculum Development in Mathematics* K-12. Contained within this assessment supplement are annotations that should be useful in understanding state and local responsibilities in assessing curriculum at the fourth, eighth, and tenth grade levels. This document indicates appropriate content and process specifications that should be useful in establishing curricula that prepares students to be proficient in mathematics.

Since the fourth and eighth grade benchmarks were established by the Framework's design, the column labeled, "What Students Should Know," establishes content that is appropriate for state testing. In addition, at the fourth, and eighth grade, the column labeled "What Students Should Be Able To Do" indicates appropriate processes for assessment. The last column labeled "Assessment Notes" further clarifies whether these processes are best assessed at the state or local level. If the phrase " Grade (4 or 8) state assessment" is shown-then this indicates that this process may be tested on the state mathematics examination at the indicated grade level.

Because benchmarks were not explicitly indicated at the tenth grade, the assessment notes provide information for both the "To Know" and "To Do" columns. The assessment notes indicate whether the content and processes are appropriate for assessment at the tenth grade on the state examination. Under the " Know" and "Do" categories in the assessment notes column, if the notation "Grade 10 state assessment" is indicated then this identifies content and processes that may be assessed at the state level. Under the " Do" of the assessment notes, process items are classified on whether these are assessed at the state level or better assessed at the local level. The notation "Beyond 10th grade state assessment" indicates material that students may or may not have covered at this point and therefore is not tested at the state level.

All of the benchmarks that were identified by the notation, "Grade (4, 8, or 10) state assessment," will not necessarily appear on a state test in any given year. The number of test items developed to access mathematical content and processes may vary from year-to-year. Only Framework pages that required assessment notes are provided within this document which results in the skipping of some page numbers.

II. Communication

What All Students Should Know	What All Students Should Be Able To Do	Fourth Grade Assessment Notes
By the end of grade 4, all students should know	**NOTE: Each item in this column is designed lo address several elements of "what all students should be able to do."** *By the end of grade 4, all students should be able to*	Do
1. The language of mathematics may be used in reading, writing, listening and speaking.	a. relate physical materials, pictures, and diagrams to mathematical ideas (NCTM Standard 2; MO 2.1)	a. Grade 4 state assessment
2. Mathematical ideas may be represented by visual models.	b. organize information into useful forms, such as verbal, symbolic, or graphic (NCTM Standard 2; MO 1.8)	b. Grade 4 state assessment c. Grade 4 state assessment
3. Mathematical symbols represent real-world situations.	c. reflect on and clarify thinking about mathematical ideas and situations (NCTM Standard 2; MO 2.2)	d. Grade 4 state assessment e. Local assessment for discussion, listening, and using technology; otherwise, Grade 4 state assessment.
4. Information may be organized in a variety of ways.	d. communicate the relationship between everyday language, mathematical language and symbols (NCTM Standard 2; MO 2.3)	
	e. demonstrate the ability to select and apply appropriate strategies, such as representing, discussing, reading, writing, listening, and using technology in mathematics (NCTM Standard 2; MO 2.2)	

II. Communication

What All Students Should Know	What All Students Should Be Able To Do	Eighth Grade Assessment Notes
By the end of grade 8, all students should know	**NOTE: Each item in this column is designed to address several elements of "what all students should be able to do."** *By the end of grade 8, all students should be able to*	Do
1. The language of mathematics may be used through reading, writing, listening, and speaking.	a. model situations using oral, written, concrete, pictorial, graphical, technological, and algebraic methods (NCTM Standard 2; A40 1.8, 2.1)	a. Local assessment for oral and technological, otherwise, Grade 8 state assessment.
2. How to represent mathematical ideas with visual models.	b. reflect on and model mathematical ideas and mathematical situations common to the classroom and the workplace (NCTM Standard 2; MO 2.6, 4.8)	b. Local assessment
3. Mathematical symbols may be used to represent a variety of situations.	c. reflect on and clarify their own thinking about mathematical ideas and situations (NCTM Standard 2; MO 2.2)	c. Grade 8 state assessment
4. That information may be organized in a variety of ways.	d. develop common understanding of mathematical ideas, including the role of definitions (NCTM Standard 2; MO 2.2, 2.3)	d. Grade 8 state assessment
	e. draw mathematical ideas and conclusions from reading, listening, and viewing (NCTM Standard 2; MO 3.5, 4.1)	e. Local assessment for listening, and viewing, othenvise, Grade 8 state assessment.
	f. discuss mathematical ideas, make conjectures, and present convincing rationales (NCTM Standard 2; MO 2.4)	f. Grade 8 state assessment
	g. connect mathematical notation and its role in the development and structure of mathematical ideas (NCTM Standard 2; MO 1.6, 1.9, 2.4)	g. Grade 8 state assessment

II. Communication

What All Students Should Know

By the end of grade 12, all students should know

1. The language of mathematics may be used through reading, writing, listening, and speaking.
2. Mathematical ideas may be represented with visual models.
3. Mathematical symbols may be used to represent a variety of siluations.
4. Information may be organized in a variety of ways.

What All Students Should Be Able To Do

NOTE: Each item in this column is designed to address several elements of "what all students should be able to do."

By *the end of grade* **12,** *all* **students** *should be able to*

a. reflect upon and clarify thinking about mathematical ideas and relationships (NCTM Standard 2; MO 1.6, 2.2)

b. interpret generalizations discovered through investigations to formulate, revise, and adjust mathematical definitions (NCTM Standard 2; MO 1.2, 1.7, 2.2)

c. visualize mathematical ideas by reading about, listening to, or viewing concrete models (NCTM Standard 2; MO 1.9, 2.4)

d. plan and create effective verbal and non-verbal forms of communicating mathematics for a variety of purposes and audiences (NCTM Standard 2; MO 2.1)

e. present mathematical ideas and logical justifications, both written and oral (NCTM Standard 2; MO 2.1, 3.5, 4.1)

f. ask clarifying and extending questions about the mathematics read about, heard about, or viewed through models (NCTM Standard 2; MO'2.3)

Tenth Grade Assessment Notes

Know	Do
1. Grade 10 state assessment	a. Grade 10 state assessment
!. Grade 10 state assessment	b. Local assessment
I. Grade 10 state assessment	c. Local assessment for listening or viewing, otherwise, Grade 10 state assessment.
4. Grade 10 state assessment	d. Local assessment for verbal, otherwise, Grade 10 state assessment,
	e. Local assessment for oral, otherwise, Grade 10 state assessment.
	f. Local assessment

II. Communication

What All Students Should Know	What All Students Should Be Able To Do	Tenth Grade Assessment Notes
	g. recognize the economy, power, and elegance of mathematics notation and its role in the development of mathematical ideas (NCTM Standard 2; MO 1.6, 1.9, 2.4)	Do
	h. read, write, and talk about mathematical ideas as they relate to real-life applications and multiple workplace situations (NCTM Standard 2; MO 1.10, 2.6, 3.2, 4.8)	Do g. Local assessment h. Local assessment for talking, otherwise, Grade 10 state assessment.